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## Heroin shortage in Coastal Kenya: A rapid assessment and qualitative analysis of heroin users' experiences

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### Abstract

**Introduction**—While relatively rare events, abrupt disruptions in heroin availability have a significant impact on morbidity and mortality risk among those who are heroin dependent. A heroin shortage occurred in Coast Province, Kenya from December 2010 to March 2011. This qualitative analysis describes the shortage events and consequences from the perspective of heroin users, along with implications for health and other public sectors.

**Methods**—As part of a rapid assessment, 66 key informant interviews and 15 focus groups among heroin users in Coast Province, Kenya were conducted. A qualitative thematic analysis was undertaken in Atlas.ti. to identify salient themes related to the shortage.

**Results**—Overall, participant accounts were rooted in a theme of desperation and uncertainty, with emphasis on six sub-themes: (1) withdrawal and strategies for alleviating withdrawal, including use of medical intervention and other detoxification attempts; (2) challenges of dealing with unpredictable drug availability, cost, and purity; (3) changes in drug use patterns, and actions taken to procure heroin and other drugs; (4) modifications in drug user relationship dynamics and

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#### Contributors

SM, GM, MM and RN designed and implemented the study. SM and GM performed the analysis with strong support from EML in conceptualizing the findings and writing the first draft. All authors provided substantial revisions to the manuscript and approved the final version.

#### Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. The authors declare that they have no non-financial competing interests.

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networks, including introduction of risky group-level injection practices; (5) family and community response; and (6) new challenges with the heroin market resurgence.

**Conclusions**—The heroin shortage led to a series of consequences for drug users, including increased risk of morbidity, mortality and disenfranchisement at social and structural levels. Availability of evidence-based services for drug users and emergency preparedness plans could have mitigated this impact.

### Keywords

Heroin shortage; KENYA; HIV; Medication-assisted treatment; Drug treatment

## Introduction

Heroin shortages, characterized by an abrupt onset, are relatively rare events that create the potential for an increase in risk-taking behaviors; however, the impact on individual behavior remains understudied (Degenhardt, Day, et al., 2005; Degenhardt, Day, & Hall, 2004; Jaffe, 2005). Heroin droughts are associated with overdose due to decreasing tolerance or drug adulteration, polysubstance drug use, engagement in risky injection behavior, change in demand for drug treatment services, and an increase in criminal activities (i.e. theft, violence; Gibson, Day, & Degenhardt, 2005; Weatherburn, Jones, Freeman, & Makkai, 2001).

The availability of comprehensive HIV prevention programs, including needle and syringe programs (NSP) and medication-assisted therapy with methadone (MAT), along with a supportive harm reduction policy environment are important in the context of heroin shortages (PEPFAR, 2010; WHO, 2013). MAT is effective in treating heroin dependence thereby reducing associated risks including Hepatitis C, HIV and death (Amato, Davoli, Ferri, Gowing, & Perucci, 2004; Gowing, Farrell, Bornemann, & Ali, 2004). By making clean needles and syringes available, NSP decreases drug-related risk behaviors such as sharing of injection equipment (Strathdee, 2001).

Heroin shortages have been reported in the United States during World War II and the early 1970s (Agar, 1978; Schneider, 2008), Australia in 2001 (Degenhardt et al., 2004; Degenhardt, Gascoigne, Howard, & Webber, 2002), and England in 2010 (Hallam, 2011; Simonson & Daly, 2011). The Kenyan shortage described here may be the first to be documented in a developing country. Kenya faces an emerging HIV epidemic among injection drug users (Kenya, Ongecha-Owuor, & Oguya, 2011; Kurth et al., 2015). Both heroin smoking and inhaling have been documented in Kenya since the 1980s (Beckerleg, Telfer, & Sadiq, 2006). Heroin trafficking from Pakistan and Iran to East Africa is well established and seaports in Mombasa, in coastal Kenya, are vulnerable to drug trafficking (UNODC, 2012). Kenya has been heavily impacted by a generalized heterosexually transmitted HIV epidemic, however while the HIV prevalence among adults in the general population is 5.6%, over 20% of injectors on the coast are infected with HIV (Kurth et al., 2015; Lyerla, Murrill, Ghys, Calleja-Garcia, & DeCock, 2012). Recent estimates indicate a large and growing population of injectors in coastal Kenya reporting high risk behaviors (Kenya et al., 2011). Despite this high burden of HIV among heroin injectors, access to

needle and syringe programs (NSP) and medication-assisted therapy (MAT) were publically unavailable at the time of the shortage.

The heroin shortage in Coast Province, Kenya, which occurred between December 2010 and March 2011, was precipitated a series of events that began with a speech by the former U.S. Ambassador to Kenya discussing drug trafficking, money laundering, use of drug profits by drug barons to influence political processes, particularly in the Coast Province (Michael Ranneberger, November 16, 2010). The Kenyan Minister of Internal Security then named members of Parliament and a Mombasa businessman with suspected involvement in drug trafficking. Attention was drawn to this issue at the local level; demonstrations by local women's groups challenged the government to take action against drug barons supplying drugs to users. The subsequent arrests, mostly of low-level drug dealers and peddlers, pushed higher-level suppliers underground to reduce the possibility of arrest, which in turn reduced the supply of heroin to users (Githongo & Wainaina, 2011; Munyi, 2011). The sudden scarcity of heroin rapidly led to severe opioid withdrawal and demand for treatment by thousands of drug users (Kitimo, 2010). Following the onset of the shortage, the chairman of Kenya's National Campaign Against Drug Abuse requested assistance from the U.S. Office of the Global AIDS Coordinator in carrying out an assessment to document to the consequences of the shortage and make recommendations for introducing evidence-based services for heroin users (Njenga, 2011).

In this paper, we report findings from this rapid assessment conducted in Coast Province, Kenya. We describe, from the perspective of heroin users: the landscape before, during, and after the shortage, including (a) actions taken to get drugs during the shortage and associated challenges, (b) changes in drug use patterns and types of drugs used during and after the shortage, and (c) injection practices and drug paraphernalia sharing that increased risk for blood-borne diseases, including HIV. Findings are used to make recommendations for health and other public sectors in Kenya.

## Methods

The rapid assessment was carried out April–May 2012. Rapid assessment methodologies allow for quickly collecting locally relevant data, particularly with hard-to-reach and stigmatized groups. Rapid assessments are a relatively low cost method that engages the local community and target populations and makes recommendations based on local realities, which is useful in influencing policymakers. Like other qualitative methods, rapid assessments do not show magnitude, do not result in statistically significant results, and are generally only rapid in the collection, not analysis stage, as traditional coding practices are used. Additional strengths, weaknesses, and challenges of rapid assessment are extensively discussed in the literature (Needle, Trotter, Goosby, Bates, & Von Zinkernagel, 2000; Needle et al., 2003; Singer et al., 2005).

## Data collection

Field staff were recruited from the University of Nairobi-Manitoba and community-based service organizations (CSO), which have a long-standing relationship with the target population. About 30 staff received a weeklong training on individual and group

interviewing, recruitment, safety, and ethical issues and were divided into two-person interviewing teams to facilitate note taking and audio recording.

Data were collected using key informant interviews (KIIs) and focus group discussions (FGDs) at seven sites: Bamburi, Kilifi, Lamu, Likoni, Malindi, Mombasa Island, Mombasa West, and Ukunda. A purposive sampling approach was used whereby CSO field staff used a verbal script to approach heroin users from drug-using communities where drug sales and use occurred. Sampling aimed at exploring a range of heroin user experiences of the heroin shortage, as opposed to sampling the population for empirical generalizations. Eligibility criteria included: at least 18 years of age, fluent in English or Kiswahili, resident of the Coast Province during the majority of the past two years, self-reported heroin or other opiate use (smoked, inhaled, or injected) at least once in the past year, and willing to take part in an audio recorded interview.

Ethical approval was obtained from institutional review boards from the Kenyatta National Hospital and the U.S. Centers for Disease Control and Prevention. Before initiating data collection, all eligible persons underwent verbal informed consent procedures. Separate open-ended discussion guides, which were organized by several domains of inquiry, were used for KIIs and FGDs. The four overlapping domains of inquiry for this analysis focused on: drug use and acquisition, service demand and utilization, extent of community support, and recommendations for needed health services for heroin users. Since discussion guide questions were based on changes over the pre-shortage, shortage, and post-shortage periods, a visual aid was used to help participants refer to the different periods. Transportation vouchers and refreshments were provided to KII and FGD participants. A total of 66 KIIs and 15 FGDs, lasting an hour on average, were conducted.

## Data analysis

Audio-recorded KIIs and FGDs were transcribed verbatim in the interview language (Kiswahili) and translated into English for computer-assisted qualitative analysis in Atlas.ti. Analysis was undertaken by the first three authors. We extracted text from the complete transcripts for the four domains. All three analysts undertook multiple reads of these texts before developing a preliminary analysis codebook, which was based on an organizational system reflecting a priori themes investigated during the interviews (Table 1). For each theme, we first identified the context in terms of people, time, and space/settings, events, and actions/consequences. Next we determined probable situations linked to each of the broader thematic foci. Lastly, we identified the landscape (environment) likely to be associated conceptually with each one.

After several careful readings of the extracted text by all three analysts, each analyst was assigned a domain (one analyst was assigned two domains) to independently mark and broadly code meaningful pieces of text. We re-sorted the data by these broad codes as well as the temporal sequence (i.e., before the shortage and during the shortage), created thematic labels representing both emic categories (derived from participants) and taxonomic classification of concepts we interpreted to be related, and independently applied them to appropriate text. Reassignment of domains occurred and percent agreement assessed for paired text between analysts. Coding discrepancies were discussed between the three, the

codebook was revised, text recoded accordingly, and the process repeated until satisfactory percent agreement ( 90%) was obtained for all codes. As a final step to ensure overall consistent code application, the first author reviewed all coding and resolved any remaining coding discrepancies.

In addition to triangulating data across interviewers, data triangulation was assessed across sites and modes of data collection. While no differences were noted between themes in KIIs and those in FGDs, more elaborate descriptions were found in the KIIs and consensus of themes were identified in the FGDs. Given the rapid assessment design of our study, member check validation, whereby findings are presented to participants or community members to confirm the accuracy of the interpretations, was not undertaken.

An interpretive hermeneutic technique (Patterson & Williams, 2002; Patton, 2002) was used to understand the meanings of social events and actions in the context of relevant historical and cultural factors (Byrne, 2001) during the coding process. Interpretive hermeneutics relies on an open-minded approach to examine research participants' awareness and reflection of particular experience given a particular context. Understanding the various ways in which people experience and make sense of a phenomenon is emphasized. Analysis requires researchers be aware of and suspend their own preconceptions; interpretation occurs in an iterative manner.

After coding was finalized, we used a thematic analysis approach to interpret and contextualized the heroin shortage as a disruptive life event that was unplanned and unanticipated (Angelides, 2001; Mills, 1959; Riessman & Quinney, 2005) for most, if not all, heroin users. We then revised our original organizational system to better align with the emerging personal experiences and hearsay accounts (i.e., stories indirectly heard about others' experiences) described. Lastly, we examined the interrelationships between themes.

## Results

Table 2 provides the revised thematic framework that emerged from our analysis. While the thematic foci remained the same, reconceptualization of the situational factors and landscape for some themes was required. Overall, participants' accounts of the shortage were rooted around desperation and uncertainty. Emphasis was primarily on dealing with a social, economic, and political landscape in which they were caused to question or become more mindful of: (1) heroin availability, cost and quality; (2) withdrawal and strategies for alleviating symptoms of withdrawal; (3) changes in drug use patterns, and actions taken to procure heroin and other drugs; (4) modifications in drug user relationship dynamics and networks, including introduction of risky group-level injection practices; (5) community response (support by some and reproach by others); and (6) new challenges emerging from the resurgence of heroin.

### Heroin availability, cost, and quality

Participants attributed the scarcity of heroin in the Coastal Province to increased law enforcement, which had caused drug barons and peddlers to retreat from the drug market. KII and FGD participants explained that drug peddlers took extra efforts to hide from local

law enforcement for fear of being “hunted” by the police, arrested, and harshly sentenced. Without a supply of drugs to sell, it was reported that they did not have money to “payoff” police officers.

The price of heroin reportedly rose from 40–200 Kenyan shillings per dose (less than \$2) to 90–600 shillings (up to \$6) during the crisis of heroin shortage and back to about 200 shillings after the crisis. Participants frequently mentioned that during the shortage, available heroin was adulterated. Cement, chalk, powdered bleach, and other additives were mixed to cut the drug, thereby reducing the quality and posing risk to those who injected it. As indicated by a male KII from Bamburi, heroin was even adulterated with caffeine:

“They used to mix the drug [with caffeine]. You can know because when you put it in a syringe it separates and it collects at the bottom.”

### **Pain, withdrawal, and the search for treatment**

The starting point for descriptions of the *unga* (heroin) shortage began with personal and hearsay accounts of the painful symptoms of withdrawal and acute *arosto* (cravings). Most participants gave descriptions of headaches, vomiting, diarrhea, body aches, and other painful physical reactions endured as a result of having to cut back or entirely stop using heroin. In some instances, participants spoke of the death of friends or acquaintances related to acute withdrawal. A male KII participant from Ukunda explained:

“...as a result of sudden stoppage and actually some died since there are some who couldn't stay without even for three hours. These had a lot of troubles. Some even got heart attacks and died. I know of six people who died. ...There is always feelings of fatigue, continued diarrhea, dehydration, loss of appetite and frequent visits to the toilet, plus sweating profusely.”

Across KIIs and FGDs, accounts of codeine as the primary drug treatment solution described limited and insufficient pharmacotherapy results. Additionally, healthcare worker demeanor toward heroin users, codeine dosing approaches, and changes in illicit drug-use patterns related to codeine treatment were also highlighted. While involuntary, transfer of heroin users to treatment by the authorities or *sungu sungu* (religious leaders who take on the role of civil obedience monitoring) was reported. Some participants observed a change in the way they were regarded by police, with a focus on health care over criminalization.

Persons experiencing extreme withdrawal and related complications were reported to be admitted on an inpatient status. Others were provided medicine via outpatient services, including mobile distribution. Most participants indicated that the medicinal effects of the codeine effectively dulled the pain associated with withdrawal; however, insufficient dosage for pain management was also described. Some dispensing sites were said to follow a group patient dosing schedule, whereby patients would be dosed together at the same amount with dosing tapered over time. When a new patient presented for treatment, he was folded into the group and prescribed the same amount as his fellow patients. Participants explained that in such instances, a person did not receive dosage levels adequate for attenuating withdrawal pains and, therefore, continued using heroin. As explained by a male KII participant in Mtwapa, changes in mode of using heroin also occurred:



“The medication they gave us was good because it helped me reduce my heroin intake. The only problem was that, when I went back for more of the medicine they refused to give me more so I moved from smoking the heroin and started injecting heroin because the heroin was scarce. If I found 2 or 3 doses, I would use that to inject myself. I never went back to the hospital.”

Participant stories of codeine detoxification were interwoven with accounts of being treated as if they were invisible and other unpleasant encounters with clinic staff. Invisibility-related stories centered on descriptions of nurses walking past a queue of users, and rather than providing consultation for care, the nurses took breaks or entirely ignored patients. Many participants indicated that this was a deterrent to treatment and they would leave before they were prescribed medicine. An overriding perception was that the nurses were unfamiliar with addiction. Heroin users described the nurses as not knowing how to treat their withdrawal symptoms and being unfamiliar with the physical and emotional toll that came from either withdrawal or injection practices (e.g. wound and abscess care).

### Changes in drug use behaviors and patterns

Themes around changes in drug use related to drug treatment during the shortage ranged from completely stopping heroin use to a continued search for heroin despite recognizing that circumstances had forced them to use less heroin of poorer quality. Personal and hearsay accounts of users switching to smoking heroin mixed with cannabis (a cocktail) and using other drugs to relieve withdrawal symptoms were presented. A male KII from Ukanda described his own behavior during the shortage and what he noticed in others:

“During the shortage only those who had the stock were able to have the drugs. It was very challenging because heroin was not available. Some of them used [homemade brew] others used [Rohipnol], beer and tablets. During the shortage I was using [marijuana].”

In a FGD from Kilifi, male participants describe using other drugs with the intent of achieving similar effects to what they got with heroin while suppressing withdrawal symptoms:

“When there was a shortage, people experienced a lot of difficulties in accessing the heroin so we shifted to [homemade brew] and some tablets called [Rohipnol]. These are what helped us to get high. Most people used [Rohipnol] too because one of the biggest problems when you don't get the heroin is lack of sleep. The [Rohipnol] would help us deal with that problem.”

Some of the participants focused on how the diminishing drug quality or quantity necessitated shifting from smoking heroin toward injecting it to experience the *steam* (high). A female KII participant from Kilifi stated:

“I also started injecting myself during the shortage because the unga was not powder; it was somehow wet. It was like toffee.”

A few participants stated that during the shortage, the practice of injecting the blood of a user who had recently injected (i.e., flashblood) was adopted to offset withdrawal. These

accounts sometimes involved multiple persons taking part in the “sharing” of blood, as suggested this female FGD participant in Kilifi:

“If I may add, we sometimes shared blood from one of the users who had earlier injected. The blood could be shared with as many people as possible to help them reduce withdrawal symptoms.”

Furthermore, it was viewed that sharing the blood of someone who had recently injected heroin produced a “steam” that lasted longer than that which was derived from smoking heroin. One male from Bamburi stated:

“Yes, there are those who share the dose that they inject themselves. One person injects and when the steam has risen the friend who has arosto, gets blood from him and injects and gets better. The steam stays longer when injected, not like the cocktail which you will have to smoke again.”

### Changes in social dynamics

Given the challenges that arose in accessing sufficient heroin, participants recounted the desperation that led users to take part in potentially dangerous and health compromising actions to get drugs. In some instances, the shortage drew users together and in others, competition and conflict arose. In situations where drug users relied on one another to access or buy heroin, risky injection practices emerged. A female FGD participant from Lamu recounted:

“Before the shortage, I never shared with anyone. During the shortage, I shared because heroin was not accessible. After the shortage, I do not share because I do commercial sex and when they pay me, I inject myself.”

Joint actions to get heroin included users pooling their resources and coordinating travel to procure heroin that would be shared among a group. Users relied on rumors about where heroin could be purchased. Descriptions were provided of drug users traveling long distances within the coastal towns and as far away to Nairobi (500 km from the Mombasa coast) in search of heroin. A male KII participant from Ukunda said the following about his network's experience:

“We really suffered; we were spending a lot of money on drugs because we bought it at a very high price. We used to go looking for it wherever it was found, even if it was in [Nairobi]. You had to look for money, go and look for it and ensure that you buy it and use it. Because if you didn't use it, you felt as if you were suffering from malaria or typhoid. But sometimes you would go there to buy it and fail to get it because your friends might attack you and snatch your money. So you miss it.”

### Public response

The *sungu sungu* were described as taking an oppositional stance toward drug use, appointing themselves as neighborhood police and physically attacking users caught stealing or injecting drugs. Some drug users indicated that they were more afraid of the *sungu sungu* than they were of the police. The police, they said, were “small minded” and looked for a



bribe while the *sungu sungu* were seen as more violent. Participants described instances of drug users being lynched or set on fire. A female KII respondent from Baburi recalled:

“She was lynched however people could not persevere seeing her burn, but she was badly burnt. By the time they decided to help her; by taking her to the hospital, it was serious, she didn't last. She died.”

In many instances, the police reportedly took on a referral role and began escorting people for treatment to health facilities, rather than arresting them. Participants indicated that the police practice of taking bribes from drug users decreased during the shortage. Participants described a change in law enforcement policy whereby drug sellers would be targeted for arrest and users would be directed, seemingly involuntarily, to hospitals. Male FGD participants from Bamburi and Malindi recounted:

“There was harassment in the sense that the law enforcement officers would come and arrest you. You would think that they were taking you to prison but that was not the case; they were taking us to hospital in order to be given medicine.”

Male participants' responses suggested they had more awareness than female participants about the availability of hospital support and codeine treatment services. They named individual organizations, described services offered, and mentioned that they accessed these services. Females seldom talked about services availability and access. Females from a Ukunda FGD responded in unison, “Ooh! No.” When asked whether there were any non-governmental organizations (NGOs) or CSOs that could help them. One female from this same FGD group said:

“There are no NGOs or CSOs that I know of that came out to offer any services to us before and during the crisis.”

### Heroin market resurgence

KII and FGD participants indicated that following the resurgence of heroin, the cost, while not as low as before the shortage, decreased substantially and that drug purity was somewhat reestablished. In the absence of effective drug treatment programs, persons who had stopped using heroin faced a continued urge to use and eventually returned to using drugs as exemplified by a FGD participant from Kilifi:

“The use of [codeine] will not help us; I have tried it but it didn't help me. Even after taking those medicines, you are just tempted to go out and smoke or sniff with friends. Even if you wanted to sleep after taking them, you cannot really sleep.”

Additionally, participants explained that peer pressure from other users, temptation from seeing others use, and idleness (due to lack of employment) contributed to relapse when heroin availability resurged. A male FGD participant from Likoni describes these factors related to relapse:

You may be arrested and taken to a rehab somewhere, and it is important that when we are released, we should be given some work to do. Because when you go back home, you will mix with your former friends. When you are idle you definitely relapse into using drugs.”

Narratives also focused on accounts of overdosing and death as drug availability resumed and purity improved. Participants explained that during the shortage, users developed a lower tolerance given that some were completely or partially abstaining, were using adulterated heroin, or relying on a combination of drugs to get the sufficient “steam” (high) to stave off cravings or withdrawal. They indicated that when heroin became available again, the potential for overdose was thus elevated. A female KII participant from Mtwapa explains:

“Like somebody came from abstinence for many months and then all of a sudden you relapse shoot yourself much and you immediately go into. . . I know of one friend in Malindi, he died because he stopped and when he went to take the stuff it was strong and he put a lot in his syringe and shot himself and died.”

Participants explained that when the heroin drought ended, health facilities that had provided codeine at no patient cost started charging for it. Participants expressed that the fee was prohibitive for those who wanted to access this medication. Most of the persons interviewed indicated that they were unemployed and earned money through selling scrap and doing any odd jobs. Participants were inclined to use this money to buy drugs, not seek codeine, as the codeine only mildly relieved pain from withdrawals. When the heroin supply resumed, the quality improved, the price decreased, and selling points where heroin was previously available re-emerged. Without free access to withdrawal pain relief from codeine or methadone to curb cravings, many people returned to heroin use. Reports of overdose and death were reported. A female KII participant from Malindi stated:

“Surprisingly, most of the deaths occurred when the unga was plentiful. The police relaxed, the community relaxed and everywhere you went, it was raining unga so the users had a field day and most of them died due to overdose.”

KII and FGD participants indicated that Kenyans in the Coast region primarily smoked heroin before the crisis, but given the lower quality of heroin, its increased costs, and diminished availability, users turned to injecting because it was a more effective high. Once the heroin supply resumed, and injection had become their preferred mode of administration, a new cohort of injection drug users emerged. A male KII from Mtwapa explained:

“Some of us who used to smoke before the shortage have now moved to injecting heroin because it is now available in large quantities.”

## Discussion and conclusions

We provide first-hand accounts on the course and consequences of an abrupt heroin shortage from the perspective of heroin users themselves. Reports of heroin shortages typically rely on quantitative data, aggregated at the state or national level, to describe changes in drug use, consequences of drug use, and demand for treatment (Degenhardt, Day, et al., 2005; Weatherburn et al., 2001). These accounts, mostly from Australia, conclude that shortages result in an overall improvement in the drug use situation after a period of both positive and negative effects related to risky drug use, morbidity, and service use among drug users. This is likely because they occur in favorable contexts where injection is the primary method of heroin administration and harm reduction interventions are accessible (Degenhardt, Hall, et al., 2005; Jaffe, 2005). This study is among the first to document the individual-level impact

of a heroin drought using qualitative data from heroin users who were most affected by the sudden change in supply (Harris, Forseth, & Rhodes, 2015).

Despite the GoKs quick response to provide emergency treatment services during the heroin shortage, the consequences on drug users were unanticipated and severe as health facilities were not able to address the health crisis experienced. Similar to the heroin shortages in Australia (Degenhardt, Conroy, Day, Gilmour, & Hall, 2005; Degenhardt, Day, et al., 2005) and England (Hallam, 2011; Simonson & Daly, 2011), we found that in the Kenya shortage, prices for heroin increased, purity decreased, and drug substitution and poly-drug use were practiced. In his review of Australia's 2001 shortage, Jaffe (2005) cautioned the effects of abrupt changes to the heroin supply in places where smoking and inhalation are the primary modes of heroin use (Jaffe, 2005). Our findings validate this concern. Unlike the shortage in Australia, we found that injection increased as users transitioned from smoking to injection of heroin during the shortage to compensate for the low quality and quantity. Participants noted injection behavior and equipment sharing continued after the shortage ended. Findings also suggest the practice of flashblood, whereby another users' blood is deliberately injected in an effort to share the high or stave off withdrawal pangs. These practices put users at high risk for HIV and other blood-borne infections, risks that could have been moderated by reducing demand for drugs, drug use, and unsafe injection, achieved through use of MAT and NSP (PEPFAR, 2010; WHO, 2013).

In the absence of MAT in Kenya, the heroin shortage may have contributed to the number of heroin users who underwent morbidity associated with acute withdrawal, drug substitution, using tainted heroin, or overdosing. Deaths resulting from acute withdrawal are extremely rare and while they were reported by participants, they were likely the result of overdose following a period of withdrawal. Additionally, heroin users may have also experienced heightened risk for HIV infection and other blood-borne pathogens. The availability of evidenced-based HIV prevention strategies like NSP and MAT could have mitigated exposure to risks, prevented the switch to injecting behavior, treated opioid dependence among users experiencing withdrawal and reduced demand for drugs. These strategies could have also reduced overdose and death.

Participants attributed heroin-related deaths during the shortage to withdrawal and use of adulterated heroin as opposed to overdoses. Overdose deaths were usually described as occurring in the context of the resurgence of heroin into the market. Anecdotally, the research team learned from partnering CSOs that drug shortages occur with some frequency, usually aligned with public holidays due to people returning home to visit their families. Although such seasonal disruption may not have the impact caused by the Kenyan shortage, public health infrastructure and readiness plans should nonetheless be instituted to adequately respond to and minimize the morbidity and mortality experienced as a result of sudden heroin unavailability.

Drug users reported disenfranchisement during and after the shortage through forced treatment, inadequate care and violence by law enforcement, health care providers and community leaders who were operating without standard protocols. People who use drugs experience disproportionately low access to and use of health and other social services.

Barriers have been well-documented and include fear of discrimination, criminalization and harassment (Ti & Kerr, 2013). While not a direct consequence of the shortage, drug users referred to this public resentment in the context of the shortage. Negative experiences during the shortage may have led to further marginalization of drug users from health and social services.

Since the documentation of the shortage, MAT and NSP were recommended to the national government and have been introduced in Kenya (Rhodes et al., 2015). Implementation of these evidence-based interventions along with recommendations outlined below should be considered in contexts with precipitating factors described here: emerging heroin epidemics, absence of prevention and response systems for drug uses, and non-injection as primary administration mode. The effects of the Kenyan shortage should be used as a catalyst to inform a comprehensive response and emergency preparedness strategy. Insights from the FGDs and KIIs show the importance of an organized multi-pronged approach. In health facilities, providers and clinical management staff could be trained on treating opioid addiction, acute opioid withdrawal, and human-rights based treatment of patients. From an emergency response perspective, the Ministry of Health could develop a protocol for supply chain systems for providing appropriate pain relief medication, forecasting stocks for adequate dosing and re-hydrating provisions when necessary.

Engaging police and community leaders on issues and actions related to people who use drugs is also recommended. This includes psycho-social counseling, patient exit plan counseling to include long-term addiction treatment placement, and appropriate medical referrals relevant to heroin users. In particular, the referral system would benefit from needle and syringe distribution networks to ensure users that switch to injection can prevent HIV and hepatitis C transmission. Additionally, police and community members should be provided with information on risk reduction including safer drug-using behavior and safeguards to prevent overdose once heroin returns. Changes in police policy may have been helpful during the shortage, but direction to treatment facilities should be voluntary in nature. A response system should also acknowledge the authoritative role of community (*sungu sungu*) and religious leaders in the community and work to prevent physical or emotional violence towards drug users.

We note that reliability of interviewing persons retrospectively about changes in drug supply, patterns of drug use, and service uptake may be questionable given the time lag between the shortage and interview to determine changes. Our sample may not represent the range of heroin users in coastal Kenya and the absence of data collection on demographic (other than sex) and behavioral information for FGD participants does not permit us to explore the for potential differences in experiences and perspectives based on such factors. Generalization of our findings is neither appropriate nor feasible. Similar to qualitative methodology in general, team-based rapid assessments methodology is very much influenced by the researcher. Despite establishing canons for collecting and analyzing these qualitative data, our findings may be influenced by our own interpretations and biases.

In conclusion, the abrupt change in heroin availability in Kenya had important implications on mobility and mortality of drug users. Provision of a more effective emergency response

and increased availability of MAT and NSP could have mitigated severe heroin withdrawal, initiation of injection and drug/supply sharing, resumption of heroin use when the supply returned and associated risks. An emergency preparedness plan that includes health, law enforcement and civil society sectors is urgently needed.

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**Table 1**

Pre-analysis organizing system for Kenya heroin shortage rapid assessment, 2010-2011.

| Thematic foci                                      | Situational considerations                                     | Landscape  |
|--|--|--|
| Settings   | Heroin market disruption: precipitating factors                | <ul style="list-style-type: none"> <li>• High level policy speeches related to drug trafficking and profiting</li> <li>• Community demonstrations against GoK inaction on arresting “drug barons” and impact in Mombasa</li> <li>• Interdiction of heroin</li> <li>• Arrests of low level drug dealers</li> </ul>  |
| Initiating events                                  | Heroin market disruption: consequences                         | <ul style="list-style-type: none"> <li>• Abrupt and sustained shortage of heroin</li> <li>• Heroin cost increases</li> <li>• Heroin quality decreases</li> </ul>   |
| Internal reactions                                 | Public health emergency  | <ul style="list-style-type: none"> <li>• Heroin users experience acute opioid withdrawal</li> <li>• No methadone available, no NSP and some chemists sell syringes</li> <li>• Logistics of procuring and using drugs adversely impacted: <ul style="list-style-type: none"> <li>• Traveling long distances in search of heroin</li> <li>• Using in different hotspots</li> <li>• Pooling of resources</li> </ul> </li> </ul> |
| Actions by heroin users to deal with the situation | Disruption in drug users patterns: desperate and actions taken | <ul style="list-style-type: none"> <li>• Heroin users seek medical and drug treatment services</li> <li>• Logistics of procuring and using drugs adversely impacted</li> <li>• Shift from smoking to injection</li> </ul>  |
| Consequences of heroin users’ actions              | HIV risk behaviors   | <ul style="list-style-type: none"> <li>• Syringe sharing <ul style="list-style-type: none"> <li>• Sick, pooled resources must be divided, cannot access syringes</li> </ul> </li> <li>• Flashblood</li> <li>• Sex for drugs</li> </ul>   |
| Coda/return to the present                         | Morbidity  | <ul style="list-style-type: none"> <li>• Resurgence of supply leads to relapse and overdosing</li> </ul>   |

**Table 2**

Post-analysis organizing system for Kenya heroin shortage rapid assessment, 2010-2011.

| Thematic foci                                      | Situational considerations                                       | Landscape  |
|--|--|--|
| Settings   | Pain, desperation and uncertainty set the stage                  | <ul style="list-style-type: none"> <li>• Heroin withdrawal</li> <li>• Alleviating the pain               <ul style="list-style-type: none"> <li>• Seeking emergency medical services and dosed with codeine</li> <li>• Finding heroin or some other drug</li> </ul> </li> <li>• Some “forced” to quit using</li> </ul>   |
| Initiating events                                  | Heroin unpredictability  | <ul style="list-style-type: none"> <li>• Challenges in accessing heroin</li> <li>• Heroin cost increases (doubles or triples)</li> <li>• Heroin quality decreases</li> </ul>   |
| Internal reactions                                 | Disruption in drug users patterns: desperation and actions taken | <ul style="list-style-type: none"> <li>• Lower quality necessitates increased quantity and more direct method of use</li> <li>• Change in consumption mode (mainly from smoking to injecting) and drug type</li> <li>• Travel back and forth to procure drugs, changes in hotspots, involvement in criminal acts to get drugs</li> <li>• Frustration with treatment and health care worker interactions</li> <li>• Morbidity related to withdrawal, toxicity, violence, as well as anecdotes of mortality</li> </ul> |
| Actions by heroin users to deal with the situation | Social behavior: positive or negative peer pressure              | <ul style="list-style-type: none"> <li>• Heroin users help each other out/reliance on other users               <ul style="list-style-type: none"> <li>• Pooled resources and procurement efforts; dividing up of drugs</li> <li>• HIV risk behaviors, namely syringe sharing but some flashblood</li> <li>• Experienced injectors helping newer ones</li> <li>• Mistrust, competition and accounts of being cheated out of money and drugs</li> </ul> </li> </ul>   |
| Consequences of heroin users' actions              | Public response  | <ul style="list-style-type: none"> <li>• Familial and community response varies (violence, marginalization, support, advocacy)</li> </ul>  |
| Coda/return to the present                         | Heroin market resurgence   | <ul style="list-style-type: none"> <li>• Drug purity returns; accessibility and affordability leads to morbidity (relapse, overdosing)</li> <li>• Realization that treatment is lacking</li> <li>• Emergence of new injectors whose consumption mode does not return to smoking</li> <li>• Renewed or continued drug use linked to social network and lack of opportunity (being idle)</li> </ul>  |